

**IN THE CLAIMS**

1. (original): A method of measuring the partition coefficient of a compound between two immiscible solvents, said method comprising the steps of:
  - a) providing a composition which contains said compound and comprises nanoparticles having a porous surface and a first solvent, wherein a second solvent is absorbed into the pores of the nanoparticles and wherein said first and second solvents are immiscible;
  - b) separating the product of step a) into two components, the first comprising the nanoparticles and the second comprising the solvent; and
  - c) determining the partition coefficient from the partition of the compound between said first and second components.
2. (original): A composition comprising nanoparticles having a porous surface and a first solvent, wherein a second solvent is absorbed into the pores of the nanoparticles and wherein said first and second solvents are immiscible.
3. (original): A composition according to claim 2 wherein said nanoparticles form a colloidally stable suspension in said first solvent.
4. (original): A composition according to claim 2 or 3 wherein said porous surface is formed of any one of silica, alumina, titania, zirconia or carbon.
5. (previously presented): A composition according to claim 2 wherein the nanoparticles further comprise a magnetic material core.
6. (original): A composition according to claim 5 wherein said magnetic material core is formed from magnetite ( $\text{Fe}_3\text{O}_4$ ), maghemite ( $\gamma\text{Fe}_3\text{O}_4$ ), greigite ( $\text{Fe}_3\text{S}_4$ ),  $\text{Fe}_2\text{CoO}_4$ , a ferromagnetic metal or alloy or carbide.
7. (previously presented): A composition according to claim 2 wherein said nanoparticles have a diameter of between 2nm and 1 $\mu\text{m}$ .
8. (previously presented): A composition according to claim 2 wherein the porous surface layer of said nanoparticles has a thickness of between 1nm and 100nm.
9. (previously presented): A composition according to claim 2 wherein said first solvent is aqueous, particularly is water.

10. (previously presented): A composition according to claim 2 wherein said second solvent is one of n-octanol, cyclohexane, a C<sub>6</sub> - C<sub>10</sub> alkane, chloroform, propylene glycol dipelargonate (PGDP), 1,2-dichloroethane, olive oil, benzene, toluene, nitrobenzene, chlorobenzene, tetrachloromethane, oleyl alcohol, 4-methylpentan-2-ol, pentan-1-ol, pentan-2-ol, isobutanol, butan-1-ol, 2-methylbutan-2-ol, butan-2-ol, butan-2-one, diethyl ether, isoamyl acetate, ethyl acetate, etc. or a monophasic mixture of two or more of these.

11. (previously presented): A composition according to claim 2 wherein the volume ratio of said first solvent to said second solvent is between 3000:1 and 1:1 (preferably in the range 500:1 to 50:1).

12. (original): A composition according to claim 11 wherein the ratio of said first solvent to said second solvent is at least 100:1.

13. (previously presented): A method of attaining partition of a compound between two immiscible solvents comprising incorporating said compound in a composition according to claim 2.

14. (original): A composition for use in a quantitative analytical technique, comprising nanoparticles each having a porous surface and a solvent adsorbed in the pores of the nanoparticles in a predetermined amount per unit weight of the composition.

15. (previously presented): A composition according to claim 14, wherein said porous surface is formed from any one of silica, alumina, titania, zirconia or carbon.

16. (original): A composition according to claim 14 or 15 wherein the nanoparticles each have a magnetic material core.

17. (previously presented): A composition according to claim 14, wherein said solvent is immiscible with water.

18. (original): A composition according to claim 17 wherein said second solvent is one of n-octanol, cyclohexane, a C<sub>6</sub> - C<sub>10</sub> alkane, chloroform, propylene glycol dipelargonate (PGDP), 1,2-dichloroethane, olive oil, benzene, toluene, nitrobenzene, chlorobenzene, tetrachloromethane, oleyl alcohol, 4-methylpentan-2-ol, pentan-1-ol, pentan-2-ol, isobutanol, butan-1-ol, 2-methylbutan-2-ol, butan-2-ol, butan-2-one,

diethyl ether, isoamyl acetate, ethyl acetate, etc. or a monophasic mixture of two or more of these.

19. (canceled)

20. (currently amended): A method of measuring the partition coefficient of a compound between two immiscible solvents, said method comprising the steps of:

a) incorporating said compound in a composition ~~according to claim 2~~ comprising nanoparticles having a porous surface and a first solvent, wherein a second solvent is absorbed into the pores of the nanoparticles and wherein said first and second solvents are immiscible;

b) separating the product of step a) into two components, the first comprising the nanoparticles and the second comprising the first solvent; and

c) determining the partition coefficient from the partition of the compound between said first and second components.

21. (original): A method according to claim 1 or 20 wherein step c) comprises determining the amount of said compound which remains in said first solvent.

22. (previously presented): A method according to claim 1 or claim 20 wherein said compound is a bioactive drug molecule.

23. (previously presented): A method according to claim 1 or claim 20 wherein step b) is performed by any one of filtration, centrifugation and magnetic separation.

24. (previously presented): A method according to claim 1 or claim 20 wherein step c) comprises recording the UV-visible spectrum of said supernatant solution.

25. (previously presented): A method according to claim 1 or claim 20 further comprising shaking the composition of step a) prior to performing the separation step b).

26. (original): A nanoparticle having a core comprising a catalytically active species, and a porous layer surrounding the core which has a pore size such that the catalytically active species is entrapped.

27. (original): A nanoparticle according to claim 26 wherein said core catalytically active species is a biologically active species, e.g. an enzyme or other protein.

28. (original): A nanoparticle according to claim 27 wherein said biologically active species is any one of blood serum albumin,  $\beta$ -Lactamase I (Penicillinase), kinase, a carboxylesterase, metallothionin, cytochrome b, c, P450, etc.
29. (previously presented): A nanoparticle according to claim 26 wherein said porous layer is formed from any one of silica, alumina, titania, zirconia or carbon.
30. (previously presented): A nanoparticle according to claim 26 wherein said core further comprises a magnetic material.
31. (original): A nanoparticle according to claim 30 wherein said magnetic core is formed from magnetite ( $\text{Fe}_3\text{O}_4$ ), maghemite ( $\gamma\text{Fe}_2\text{O}_3$ ), greigite ( $\text{Fe}_3\text{S}_4$ ) or  $\text{Fe}_2\text{CoO}_4$  or ferromagnetic metal or alloys (such as Fe-Pt, Fe-Co, Fe-Ni), metal carbides, etc.
32. (previously presented): A nanoparticle according to claim 26 wherein said nanoparticles have an average a diameter of between 2nm and 1 $\mu\text{m}$ .
33. (previously presented): A nanoparticle according to claim 26 wherein the core of the nanoparticle has an average diameter of between 1 and 10 nm.
34. (previously presented): A nanoparticle according to claim 26 wherein the porous outer coating on said nanoparticle has a thickness between 1nm and 100nm.
35. (previously presented): An assembly of nanoparticles at least some of which are nanoparticles according to claim 26, wherein on average the number of molecules of said catalytically active species per nanoparticle of the assembly is not more than one.
36. (previously presented): A method of making a nanoparticle according to claim 26, comprising the following steps:
- a) forming, in a liquid medium, colloidal particles containing the catalytically active species to be contained in the nanoparticle core, the particles being colloiddally stabilised by a surfactant;
  - b) treating said colloidal particles by hydrolysis or pyrolysis to form the porous layer surrounding the catalytically active species.
37. (original): A method of claim 36 wherein, in step a), said colloidal particles further contain a magnetic material or a precursor to a magnetic material.

38. (original): A method of claim 36 or 37 wherein said colloidal particles comprise aqueous colloidal particles in a solvent which is immiscible with water.
39. (original): A method of claim 38 further comprising adding a salt of silicon, aluminium, titanium or zirconium to the product of step a), which forms the corresponding oxide compound upon hydrolysis at the colloid boundary.
40. (original): A method of claim 39 wherein said silicon salt is tetraethyl orthosilicate (TEOS) and the surfactant is cetyltrimethylammonium bromide (CTAB).
41. (original): A method of depositing a component in pores of a porous material, by contacting the porous material with a solution of the component in a supercritical fluid.
42. (original): A method according to claim 41 wherein the supercritical fluid is removed by depressurising it and allowing it to evaporate.
43. (original): A method according to claim 1 or 2 wherein the component is a liquid.
44. (previously presented): A method according to claim 41 wherein the component is substantially insoluble in water.
45. (previously presented): A method according to claim 41 wherein the porous material is porous particles.
46. (original): A method according to claim 45 wherein the porous particles are nanoparticles, having a particle size not greater than 1 $\mu$ m.
47. (previously presented): A method according to claim 41 wherein the porous material has a porous silica surface.
48. (previously presented): A method according to claim 41 wherein the supercritical fluid is carbon dioxide.

49. (previously presented): A method of preparing a composition containing two components comprising preparing porous particles containing a first component in a predetermined amount by a method according to claim 45, and adding said particles to a liquid second component.

50. (original): A method according to claim 49 wherein the first and second components are immiscible.